

Claims

- [c1] 1. A chemical mechanical polishing process, comprising:
providing a substrate, wherein a layer to be polished
having raised parts is formed thereon;
performing a first stage chemical mechanical polishing
process using a soft polishing pad to substantially re-
move the raised parts of the layer to be polished,
wherein the soft polishing pad is not a nonwoven fabric
layer; and
performing a second stage chemical mechanical polish-
ing process using a hard polishing pad to polish the re-
mained layer,
wherein physical properties of the soft polishing pad are
different from those of the hard polishing pad.
- [c2] 2. The process of claim 1, wherein the surface roughness
of the soft polishing pad is rougher than the hard pol-
ishing pad.
- [c3] 3. The process of claim 1, wherein a porosity of the soft
polishing pad is higher than that of the hard polishing
pad.
- [c4] 4. The process of claim 1, wherein a density of the soft

polishing pad is lower than that of the hard polishing pad.

[c5] 5. The process of claim 1, wherein a hardness of the soft polishing pad is lower than that of the hard polishing pad.

[c6] 6. The process of claim 1, wherein the soft polishing pad has the following properties:

i.a hardness of 30–35 Shore D;

ii.a density of 0.30–0.40 g/cm³;

iii.a compressibility of 2.0–3.0%; and

iv.a rebound of 70–100%.

[c7] 7. The process of claim 1, wherein the hard polishing pad has the following properties:

i.a hardness of 50–65 Shore D;

ii.a density of 0.60–0.80 g/cm³;

iii.a compressibility of 2.0–3.0%; and

i.a rebound of 70–100%.

[c8] 8. The process of claim 7, wherein the hard polishing pad comprises at least one moiety from the group consisting of urethane, an amide, a carbonate, an ester; an ether, an acrylate; methacrylate; an acrylic acid; a methacrylic acid, a sulphone, an acrylamide, a halide; an imide; a carboxyl; a carbonyl; an amino, an aldehydic; a

urea and a hydroxyl.

- [c9] 9. The process of claim 1, wherein the soft polishing pad and the hard polishing pad are combined in a polishing pad, the soft polishing pad is on a first region of the polishing pad and the hard polishing pad is on a second region of the polishing pad.
- [c10] 10. The process of claim 1, wherein the first stage chemical mechanical polishing process comprises using a slurry including CeO_2 abrasive.
- [c11] 11. The process of claim 1, wherein the second stage chemical mechanical polishing process comprises using a slurry including CeO_2 abrasive.
- [c12] 12. The process of claim 1, wherein the layer to be polished is a silicon oxide layer.
- [c13] 13. The process of claim 12, wherein a material of the silicon oxide layer comprises high density plasma silicon oxide.
- [c14] 14. The process of claim 12, wherein a material of the silicon oxide layer comprises borophosphosilicate glass (BPSG).
- [c15] 15. The process of claim 12, wherein a material of the silicon oxide layer comprises tetra-ethyl-ortho-silicate

silicon oxide.

[c16] 16. A polishing pad, having the following properties:

- i. a hardness of 30–35 Shore D;
- ii. a density of 0.30–0.40 g/cm³;
- iii. a compressibility of 2.0–3.0%; and
- iv. a rebound of 70–100%.